

Developing thinking for all learners

- guidance for teachers of learners
with special educational needs

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1. Introduction

The information in this guidance draws upon the DCELLS' three year Developing Thinking and Assessment for Learning pilot programme. Four special schools across Wales were involved in the project and introduced these ideas to learners with a range of learning difficulties. The programme is now being extended across Wales.

The pilot of the development programme was independently evaluated. The main findings were reported as:

- increased learner engagement and motivation with learning
- improved learner behaviour
- improved quality of work produced by learners (increased achievement and attainment)
- improvement in learner self esteem and confidence
- improvement in the quality of speaking and listening
- happier teachers and learners.

Two booklets¹ to support practitioners in implementing developing thinking and assessment for learning; *Why develop thinking and assessment for learning?* and *How to develop thinking and Assessment for learning in the classroom* were produced to support teachers in developing effective pedagogy.

This guidance provides additional ideas for teachers working with learners with profound and multiple learning difficulties through to learners who will move on to the developing thinking section of the *Skills framework* and beyond.

For learners with the most complex needs, additional guidance can be found in the Routes for Learning materials² which clearly outline important milestones in early cognitive development. A draft progression grid at **Annex 1** shows the links between Routes for Learning and the Developing thinking section of the *Skills framework* (this is currently being trialled in schools).

The guidance aims to:

- **encourage teachers to try new strategies and techniques to develop thinking and assessment for learning**
- **support teachers and learning support staff in reflecting on their practice**
- **provide material to prompt discussion with colleagues.**

N.B Reference to 'teachers' throughout this guidance includes learning support staff and early years practitioners.

¹ These booklets and further information can be found at:
<http://new.wales.gov.uk/topics/educationandskills>

² Welsh Assembly Government 2006 Routes for Learning can be found at:
<http://wales.gov.uk/topics/educationandskills/curriculumassessment/additionaleducationalneeds/?lang=en>

Developing thinking can be defined as developing patterns of thinking that help learners acquire deeper understanding and enable them to explore and make sense of their world. It refers to processes of thinking that we in Wales have defined as plan, develop and reflect. These processes enable learners to think creatively and critically to plan their work, carry out tasks, analyse and evaluate their findings, and to reflect on their learning, making links within and outside school.

We have tried to provide simple strategies and techniques, which can be integrated into teachers' current practice together with a concise introduction to the underlying principles and benefits of introducing thinking skills to learners with learning difficulties, including those working at the very early levels of development. We also explore the close links to **assessment for learning**. Assessment for learning is the process of finding out where learners are within a learning continuum, where they need to go and how best to get there.

2. Benefits

.....for learners

To enable learners to develop their thinking, a coherent, whole school approach is needed. As they improve their **thinking skills**, learners:

- become more focused, able to attend, observe and makes sense of information through different sensory channels
- increase their understanding of symbolic representation to support communication and learning – including asking and answering questions
- are better organised, able to plan (make a choice with intentionality), make connections and comparisons and recognise patterns
- call upon a range of strategies to solve problems
- remember and reflect on what they have done
- generalise their learning and use it to solve problems and generate ideas, moving from familiar to new situations.

Learners also develop their **social skills**. They learn to

- respond to an increasing range of stimuli, relating new experiences to prior learning and gaining sense and personal meaning from a range of activities
- initiate, from very straightforward one to one interactions to starting 'conversations' with less familiar people in wider settings
- cooperate, working with others in a variety of contexts

Learners develop **dispositions** which support the emotional aspect of learning. They develop:

- Curiosity – taking an interest, becoming involved, willing to engage and push the boundaries
- Perseverance – persisting with difficulty and uncertainty
- Confidence - moving from passivity towards independence, needing less support and coping with increasing responsibility.

“ Development is not an accumulation of knowledge, facts, information and skills.... it is a qualitative transformation” Galina Dolya, 2006, Key to Learning³

³ <http://www.kevtolarning.com>

..... and for teachers

Teachers need to engage with the principles behind the developing thinking to ensure that there is a clear rationale and systematic approach to developing pedagogy. They can use the increased flexibility of the revised curriculum to better meet the diverse needs of all learners, using the underpinning *Skills framework*⁴ to focus on learners' individual priorities and on the process of learning.

Goldstein and Noss⁵ suggest that learning can be seen in two ways. Firstly it can be compared to a mountain ascent, where the emphasis is on getting to the summit (often using one main route!). Secondly, it may be thought of as a visit to an exhibition, where, although artefacts may be arranged in a logical way, learners can explore them in any sequence and may return to them many times with different purposes or interests in mind.

Lewis and Norwich⁶ found that effective pedagogy is essentially the same for all learners, although the emphasis and intensity will vary. The approaches shown here also support assessment for learning, with learners increasingly taking greater responsibility for their own assessment and recording.

⁴ Skills framework for 3 to 19-year-olds in Wales, DCELLS 2008

⁵ Goldstein H Noss R (1990) Against the stream *Forum* 33 (1) 4-6

⁶ Lewis A Norwich B (2005) Eds. *Special teaching for special children?* (OUP)

3. Overview

Teaching

- Organise the classroom to encourage choice and responsibility for all learners
- Recognise the importance of talk/communication and provide for learners who need to use objects of reference, pictures, symbols, sign or alternative/augmentative communication. Teachers must ensure that such resources are used consistently with agreed 'shared' meaning.
- Pay particular attention to questioning in developing the thinking of all learners.
- Be aware of the impact of verbal/non verbal signals and appropriate feedback to learners
- Scaffold learning – gradually withdrawing support as learners make progress.
- Make thinking principles explicit and visible
- Allow time for learners to process information and respond
- Plan opportunities for collaboration, cooperative learning and peer assessment

Relationships

- For learning to be optimised, learners must feel valued and secure in their relationships with their peers and the adults around them.
- Adults should be aware of messages given through body language and/or verbal responses to all learners and should consider in particular, the needs of learners from diverse ethnic/cultural/linguistic backgrounds.
- Learners need to feel included and participate in activities which provide an appropriate level of challenge.
- As learners develop, they extend their roles and relationships. As they increasingly take responsibility for their own learning, the balance of their relationships may change.
- Relationships should be developed in a positive ethos where mistakes are seen as opportunities for further learning

Development profile

- Knowing each learner's level of development particularly in communication and cognitive skills, will ensure appropriate activities, language and teaching techniques are planned and used
- The profile of each learner will highlight particular considerations/barriers to learning which need to be overcome.
- The 'ethic of everybody' (Hart et al)⁷ moves away from planning for the needs of the majority, adapted for different 'ability' groups towards a universal design for all. By providing a range of ways for learners to

⁷ Hart S. Dixon A Drummond MJ Mc Intyre D (2004) Learning without Limits (OUP)

receive and understand information and express what they know, teachers can ensure that everybody is engaged and able to progress.

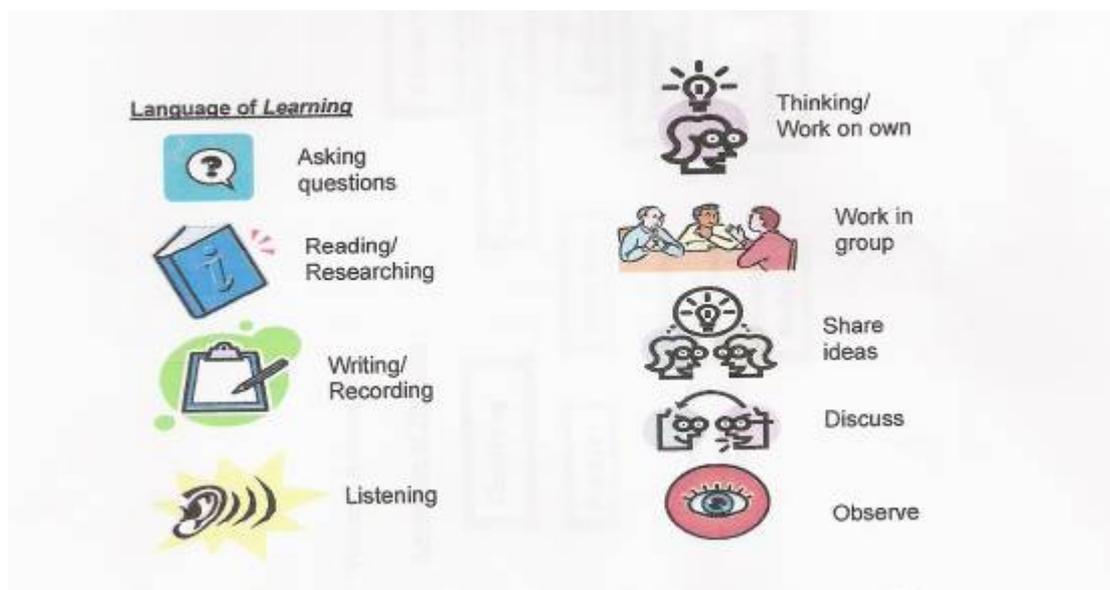
Case study 1: 'ethic of everybody'

A group of Key Stage 2 learners with a range of learning difficulties/disabilities listened to a story about a hedgehog unable to play with balloons because of his spines. The teacher paused in the story to ask the learners what they thought might help the hedgehog. Learners were able to try out a range of materials using a model hedgehog and real balloons. Follow up activities ranged from writing up findings (with a range of prompts/sentence starters) to recording key pieces of information using objects/symbols (from a limited choice). This reflects a proactive approach with appropriate stimuli, support for processing and relevant ways of expressing learning for all.

Language

- Learners need to develop a 'language of learning' and move into a 'language of thinking' using sensory cues (music, smell) objects, pictures, symbols, signs and/or words as appropriate to their developmental level
- Language can be 'scaffolded' with appropriate support through objects, pictures and symbols helping learners to develop 'symbolic literacy' and support a move towards more conventional communication.
- Open questions can be used to develop a positive "classroom climate" and encourage more independent thinking

N.B. A selection of symbols for the language of learning are given below, which can be found in the *How to develop thinking and assessment for learning* booklet.



Thinking

A range of tools and strategies have been used to help learners to plan, develop their thinking and reflect on what they have done and ways to improve. In particular, making thinking visible through the use of visual tools can help learners to organise their thoughts and increase their independence and ability to use skills in different situations. To supplement the tools/strategies in the *How* booklet, the following are the main ideas outlined in this booklet:

- The 4 modes of thinking - define, compare, sequence and cause & effect (Caviglioli & Detheridge 2006)⁸ (see page 14)
- The 3 Ps of learning (Smith 2006)⁹ - perception, processing and presentation (see page 19)
- Cooperative learning and developing learning dispositions (see pages 22 and 23)
- The TASC Wheel (Wallace 2002)¹⁰ which can be used to plan problem solving activities (see page 21)
- Tools/strategies, such as De Bono's thinking hats, from the *How* booklet which have been adapted by teachers in the pilot programme for learners with a range of additional learning needs.
- The overlap between thinking pedagogy with the principles of assessment for learning. **Assessment for learning** is the process of finding out where learners are within a learning continuum, where they need to go and **how** best to get there. Learners will be increasingly involved in their own assessment and planning next steps.

⁸ Caviglioli O & Detheridge T (2006) Making ideas come alive. *Special Children* Feb/March 2006 pp18-20

⁹ Smith I (2006) *Learning to Think – From teaching skills to developing minds* (Learning Unlimited)

¹⁰ Wallace B (2002) *Teaching Thinking Skills Across the Early Years* David Fulton Publishers

4. Dispositions

Learning to learn is dependent on developing dispositions which are essential for quality learning. Although a focus on learning to learn will not necessarily improve cognitive development, it will provide a background for quality learning.

All learners will bring certain attitudes to learning, shaped by their past experiences at home, in school and in the wider world. Teachers can positively influence learners' approaches and help them to learn more effectively by:

- Meeting **social** needs - providing a classroom environment where learners feel they belong, feel accepted and supported and have opportunities to work with others. Teachers can model effort and perseverance through their own approaches in the classroom, including ways of giving and accepting feedback
- Meeting **emotional** needs – ensuring learners feel safe, secure and able to explore and make mistakes from a 'safe' position will help them gradually become less dependent on structure. Learners need to be trusted, with opportunities to care for others, have fun and develop respect for self and peers and a pride in what they do. Teachers can move learners from compliance to greater independence, encouraging exploration and willingness to try out new ideas.
- Meeting **learning** needs – providing experiences which are relevant and connect to earlier learning to help learners make sense of the whole learning process and increase their independence. Teachers can plan a variety of learning opportunities to ensure any barriers are overcome and learners are able to show what they know, understand and can do in ways which suit them.

Learners should be enabled to learn through exciting and motivating activities which develop:

- **Curiosity** – wanting to ask questions, explore and develop new ideas
- **Perseverance** – not giving up or passively waiting for help, able to use tools at their disposal to tackle problems, see their efforts making a difference
- **Confidence** – able to carry out tasks with increasing independence, without extrinsic rewards, able to make and learn from mistakes, able to accept feedback, knowing it will help them to improve, seeing themselves as able to learn and work with others as part of a 'learning community'.

Dweck (2007)¹¹ stresses that praise for ability rather than effort gives the message to learners that success and failure depend on something beyond their control.

Teachers also need to develop a 'growth' mindset to develop new approaches in the classroom which enhance the capacity of all learners.

¹¹ Dweck C (2006) Mindset The new psychology of success NY: Ballantine Books

5. Language

Language and effective communication are an integral part of developing thinking and necessary to access the developing thinking section of the *Skills framework*.

A table summarising the key features of the levels in moving towards the development of verbal reasoning and abstract language as proposed by Blank et al (1978)¹² and further developed by Elks & Mc Lachlan (2006)¹³ can be found at **Annex 2**. Early Language Builders (Elks and Mc Lachlan 2006) gives more information on the Blank model and tips for teaching learners at each level.

Learners' language can be developed through careful use of:

- Content - moving from concrete to abstract (i.e. starting with personal experiences, objects which are present or very recent events)
- Sentences - of increasing length and with an appropriate number of information carrying words
- Questions – at an appropriate developmental level, rephrasing or simplifying if necessary and allowing time for understanding and responding
- Support - using visual/other sensory prompts which can help learners to manipulate meaning without the need to understand and use syntax. Such support can be reduced as language and memory develop.

Questioning

Questioning is the driving force of developing thinking and assessment for learning in the classroom. By responding effectively to children's speculative questions, adults can show that there is not always a 'right answer' and encourage further thought and exploration of ideas.

If adults ask closed questions, which require a very short or yes/no answer, learners may try to guess rather than thinking more creatively. Adults in the classroom should model open questions and a range of fuller answers to develop a 'thinking climate'.

Questions may

- ask for information or seek clarification
- probe reason and evidence
- explore alternative views
- test implications and consequences
- ask about the question/discussion.

¹² Blank, M.; Rose, S.A.; & Berlin, L.J. (1978). *The language of learning: The preschool years*. Orlando, FL: Grune & Stratton.

¹³ Elks L & Mc Lachlan H. (2006) Early Language Builders Elklan (www.elklan.co.uk)

For learners working at early levels of development, teachers will need to consider the cognitive demands of their questions and use them to shape understanding, helping learners to fill gaps, organize and elaborate, extending learners with questions which press for reflection and critical and creative thinking as they move on.

For learners with more complex needs, teachers can develop early questioning by pausing during familiar routines, waiting for a response from the learner.

A table of a continuum of questions, from learners working at the earliest levels of development through into the developing thinking framework can be found at **Annex 3**. It draws on the work of Anderson and Krathwohl (2000)¹⁴ who revised Bloom's Taxonomy.

¹⁴ Anderson, L. W. Krathwohl, D. R. (2000) *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*. Boston: Allyn & Bacon

6. Teaching Techniques

The following techniques, which build on the guidance provided above, have been used by schools working with learners with additional learning needs. Schools moved from theory to practice by selecting a small number of techniques to try with selected groups of learners. 'Starting small' enabled staff to see the impact of the new approaches and gain confidence before extending further. It is important that staff engage with the theory and the reasons why such approaches meet with success. It is also necessary to ensure that techniques used are a good fit with the various activities associated with them and that no one technique is over used, becoming a chore to learners. The DCELLS booklet *How to develop thinking and assessment for learning in the classroom* provides further advice on planning . The booklet *Why develop thinking and assessment for learning in the classroom* provides an overview of some of the best known commercial schemes used to support this area of work.

a) 4 modes of thinking (Caviglioli 2006)

Caviglioli developed a model, and suggests that things may be defined or compared while information about events may be sequenced or used to consider cause and effect. He suggests vocabulary linked to each of these ways of organising information which are exemplified in the case studies below. Teachers should also consider appropriate symbols for use in each sector of the model.

Caviglioli suggests that the four basic questions are:

- **What is it?** Defining, gathering and organising information into a schema using a single bubble/cluster/mind map with pictures, affinity diagram, symbols, words)
- **How does it compare?** Comparing, contrasting features of two or more items. This may be done using two concentric circles to show relevant versus non relevant information and help focus on task or via a double bubble as shown below.
- **What happens?** Sequencing– according to time, value, other criteria using a flow chart
- **Why does it happen?** Looking at cause and effect using, for example, a fishbone diagram.

Case study 2: Define – What is it?

During a science lesson, a Year 3 class in a special school used their senses to explore the characteristics of apples including colour, shape, size, feel, smell and taste. Some learners used a single bubble to record what they found out. They were later able to move on to making comparisons, developing appropriate vocabulary. Further work included looking at the relationship between the different criteria e.g. Did red apples taste sweeter?

Case study 3: Compare – How does it compare?

After reading the story 'Where the Wild Things are' by Maurice Sendak, nursery/reception learners used a double bubble to compare Max's bedroom and the jungle. They first used large plastic hoops on the floor, and placed pictures into each set. They then drew pictures of the items found in each environment in the bubble diagram and used this as a basis to describe the differences, developing the relevant vocabulary.

Case study 4: Sequencing – What happens next?

'Where the Wild things are' was used with a Year 1 and 2 class to develop sequencing skills. They were told the story in different locations around the school and in the school grounds and photographed in the various locations. This 'loci' approach helped the learners use the various places as 'external mediators' to help their memory and recall of the story. Using the locations (with photographs as memory prompts) the learners were able to remember the sequence of events with great interest and imagination and produce a flow chart to record their work.

Case study 5: Why does it happen?

A Year 3 and 4 class in a special school were investigating what seeds needed in order to germinate. The learners helped to devise an experiment to test out whether seeds would germinate under the following conditions:

- no water
- no light
- no soil/food
- in hot/cold temperatures

They suggested different ways to record their findings including a fishbone diagram and used these, together with photos to give an oral report about the outcomes of their work.

Case study 6: Looking at all 4 questions



One teacher used different coloured keys to act as a visual prompt for questions to develop different types of thinking. Large cardboard keys were used to physically 'unlock' thinking:

- a **red** key for what is it like? What does it do? (define)
- a **yellow** key for have I seen/done this before? (compare)
- a **blue** key for what happens next? (sequence)
- a **green** key for why did that happen? (cause and effect)

Making Meaning: Using symbols and visual tools

Symbols can be used to help learners to access and organise information, to make links to earlier learning and develop vocabulary.

Case study 7: Using symbols

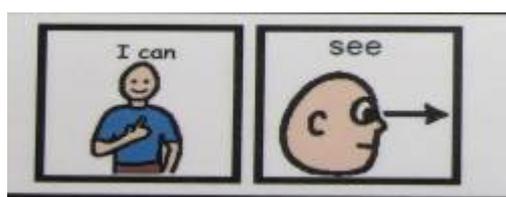
A group of KS2 pupils with autistic spectrum disorders used symbols to help them to find relevant information and to sort, sequence and compare. A series of activities were devised, based on the story of the Gingerbread Man. Slides were prepared for use with an interactive whiteboard.

Learners used symbol cards to identify things they saw in the story.

In a more focused activity, learners chose appropriate symbols to answer three simple questions about what they could see, and about the colours and characters in the story.

In a third activity, learners placed cards with pictures/symbols in a correct sequence to tell the story.

The symbols provide concrete support for learners who have difficulties with abstract language and carefully structured activities allow them to organise and make sense of information.



Using symbols helps learners to explore ideas without being dependent on conventional literacy. Symbol timetables are often used to support learners by showing symbols in a grid. This helps them to see what day/time a certain activity takes place without the need for complex vocabulary or grammar. Learners can also see the sequence of events which might require a high level of abstract processing if expressed in words.

Used with visual tools, symbols can really make thinking visible and help learners to record information and ideas which can in turn help personal understanding and memory and/or support a presentation to others. Visual techniques can also help learners to organise their thinking and see

relationships between ideas, making these apparently abstract and invisible processes much easier to follow.

Learners with more complex needs

The table below shows how some early steps, taken from Routes for Learning could be carefully planned to help overcome barriers, for example caused by poor vision, hearing or memory. Initially the onus is on the adult to shape the learner's behaviour but progress made through the levels a to b to c, shows how the learners gradually begin to play a greater role.

Routes for Learning characteristics	Responds consistently to one stimulus	Responds differently to different stimuli	Anticipates repeated stimulus
Level of learner autonomy a	Adult draws on their own prior knowledge/gathers information about learner to plan, ensuring properties of stimulus take account of visual/auditory abilities and are consistent to enable learner to build memory.	Adult considers /evaluates learning. Introduces new stimulus with different properties, with attention to learner vision/hearing, likes/dislikes.	Adult presents favourite stimulus repeatedly in regular pattern. E.g. fan blowing, presented to left then right side
b	Learner has memory of properties of stimulus, draws on these and responds in same way as previously. Adult monitors and seeks patterns in learners responses	Learner presented with new stimulus, draws on memory of characteristics of previous stimulus, compares and finds they are not the same, reacts differently. Adult, through feedback to learner, shapes 2 different responses to different sensory properties	Learner responds by turning to stimulus. Begins to anticipate repeating pattern Adult sensitive to learners reaction, waits for response before moving stimulus and ensures learner has adequate reward (see example below)
c	Learner shows increased rate/accuracy of responding – refinement	Learner shows increased rate/accuracy of responding – refinement	Learner shows increased rate/accuracy of responding – refinement

Following on from the work outlined in the previous table, we can look in more detail at the types of thinking which occur.

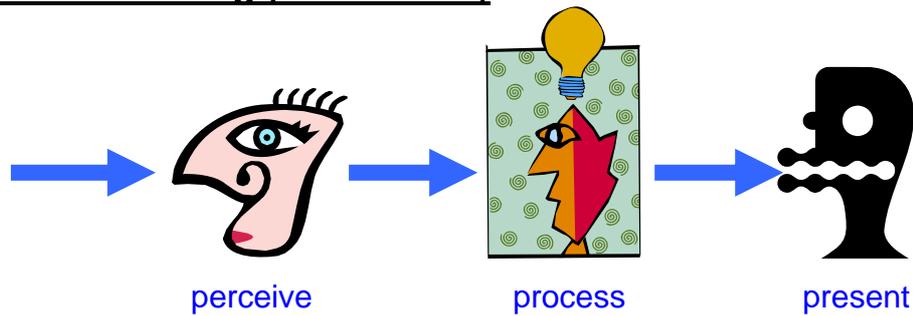
Learner responds by turning to stimulus. Begins to anticipate repeating pattern

Adult sensitive to learner's reaction, waits for response before moving stimulus and ensures learner has adequate reward.

- *What is it? (Define/Compare)* Ceri feels the fan blowing. She draws on prior learning, going through memories she has stored before recognising it. She may recognise the blowing, or the noise or both. Ceri may compare the properties of the fan (blowing, noise) to other objects she has experienced. Ceri responds by turning towards the fan, possibly smiling/closing eyes. She will have “built “ this response as the result of earlier work during which staff have made sure the stimulus properties were the same on each occasion and taken care through their own responses, to feedback to Ceri that her responses were meaningful.
- *What is happening? (Compare/Sequence)* Ceri stills, aware of the fan stopping, moving. She feels the fan blowing on the other side of her face. Again, Ceri responds, drawing on/comparing to earlier experience, by turning towards the fan, smiling. She does not yet have the experience to recognise the pattern of the stimulus, moving from side to side. Many further presentations of the fan, on alternate sides may be needed to develop her recognition.
- *What will happen next? (Sequence)* Ceri turns just before the fan is moved, beginning to anticipate where the fan will blow next.
- *Why did it happen? (Cause and effect)* Later, Ceri could be introduced to a switch to operate the fan (on a timed reward system). Ceri, following repeated experience and experimentation (including contingency responding, where she might press the switch rapidly to get the effect but not yet realise that just one push would have the same effect) would make the connection – that pushing the switch and makes the fan work. She would show this by pushing the switch then pausing to appreciate the effect of the fan.

This analysis makes Ceri's learning more visible to us. We now know that she recognises and remembers the stimulus as she responds to it in the same way each time. We also know now that she is able to process information and from experience, recognise and remember the pattern of presentations of the fan. This early ability to sequence events will form the basis for the development of anticipation.

b) 3 Ps of learning (Smith 2006)



The three (or 4) Ps do not necessarily happen in the order set out – and will also happen together rather than sequentially on many occasions. They correspond closely to the plan, develop, reflect model. Here, we look more closely at the process of thinking and consider them individually, in sequence.

Case study 8: Using the 4 Ps

Prepare – getting ready to think

As part of a project on storytelling, a KS3 class in a special school read the story 'We're going on a bear hunt'.¹⁵ They discussed the story and in particular, the sequence of events.

Perceive – getting ideas into our heads – asking /answering questions, activating prior knowledge, gathering information, deciding on a strategy and success criteria

The learners considered the question 'How can we share this story with others?'. Following a discussion about what might help them read/re-tell the story (e.g. multi-sensory props, pictures, visual prompts, text with symbols) they suggested: read to them, make a book with symbols, draw pictures, do a puppet show and act out the story.

Process - organising ideas in our heads – developing ideas, entrepreneurial thinking, thinking logically, making decisions

To help learners read the story more confidently to others, the text was typed out with symbols. They used visual diagrams (e.g. flow chart) to help them remember the sequence of the story. Learners also drew pictures and made props and puppets.

Present – getting ideas out of our heads, sharing

The learners made a book to share with others using ICT to produce text with symbols. They scanned in their pictures. They used their puppets to re-tell the story and finally acted out the story for an audience using props and different locations within the school/grounds. The symbols helped the learners to read confidently in front of an audience. For the learners working at earlier levels, puppets and props (i.e. real objects) were used to match (by physically

¹⁵ We're going on a bear hunt by Michael Rosen, Walker Books 2001

mapping/linking) to pictures, photos and symbols in order to develop symbolic literacy.

Learners with more complex needs

This work will involve another p – preparation of both staff and learner. Learners must be ready for learning i.e. comfortable, safe, secure in their relationships, physical and emotional needs met.

Staff must have prepared a consistent stimulus using prior knowledge of learner and information gathered about their earlier responses.

- **Perceive**

Learner becomes aware of stimulus (for example tactile, visual, auditory, kinaesthetic, olfactory). At first this is likely to be through near senses (touch, movement) then may involve vision and hearing as learners improve their use of information through these more distant senses. Later this incoming information will also include concepts learned through concrete objects, with a focus on physical properties then beginning to take account of more abstract features such as how objects are used as the learner's ability to take in and process information improves.

- **Process**

What is it? (define/compare new information to existing schema*, incorporate new information) What happens? (sequencing events) Why? (cause and effect) At the simplest level, the learner recognises a stimulus by comparing information about its properties stored in memory as a result of previous experience. (Activating prior knowledge, gathering information). Later, learners may seek and recognise patterns/sequences and/or cause/effect.

Staff should allow time for processing. Later visual tools may help learners to gather information, compare and select the most relevant, organise/categorise information and sequence events. Staff may help learners by modelling thinking. Staff use of language (amount of language/concreteness of content/complexity of grammar) also needs careful consideration.

- **Present**

The learner responds. At first this is likely to be a straightforward, motor response. Later, learners may consider what they did, what happened and why, make decisions and begin to use this knowledge in future learning and increasingly complex and independent responses.

Staff should allow learners to take risks, make mistakes and be independent as far as possible. The classroom/other environments should be organised to encourage learner choice and responsibility. Staff should develop strategies to help learners make connections between earlier learning and use learning in wider situations/contexts.

* schema – a mental model of the world including knowledge, understanding, attitudes which may be modified by filtering/noticing what is relevant at any one time & categorising new experiences

c) The TASC (Thinking Actively in a Social Context) Wheel See Annex 4

The TASC wheel is a tool that can be used for problem solving. It takes learners through a sequence that they can use in order to plan how to solve a problem.



Wallace 2002

Case study 9: Using the TASC Wheel

The teacher of a Year 5/6 class with a range of learning difficulties used the TASC wheel to plan a maths activity which would consolidate the learners' knowledge of 3D shapes.

After recalling what they knew about shapes, the task was set – find out what mystery shape is in the bag. The learners worked together to suggest questions which they could ask and which would help them to find out the hidden shape. They discussed the questions and selected the ones they felt would give the most useful information.

With a variety of support (including questions modelled by the adults), learners asked the questions which were answered by the teacher. They built up a picture until they were able to establish what shape was in the bag.

The learners used a traffic light system to evaluate how successful they felt they had been with the task and follow up discussion reinforced the development of questioning skills.

d) Co-operation

In planning opportunities for cooperation in the classroom, teachers should ensure that everyone has a valuable role/contribution to make and plays a part in any response/feedback.

Case study 10: collaboration and co-operation

As part of a story writing project, Key Stage 2 learners thought about 'What makes a good story for young children?'. In small groups, they read several children's stories and considered what made books attractive. Learners mapped the key features of good stories and also features which made books attractive. The next task was to bring these two sets of information together and decide what needed to go into writing and presenting their own children's story.

The teacher used a transactional model, asking learners to exchange information (written on cards with symbol prompts) and identify the key features from both sets of information and prioritise/decide what would make their own book/presentation a success (i.e. success criteria).

The learners decided that their book should have simple language, should encourage anticipation through structure and repetition and be made more attractive by coloured pictures and sound effects.

The learners outlined the key events in the story on a 'thinking tool' (mind map), decided the sequence, drew and scanned pictures and selected sounds. They then wrote the text and recorded themselves reading the story to accompany the images created in a slide show.

Finally they evaluated the finished product, considering how well it met the criteria they had drawn up.

e) *Developing dispositions*

As discussed earlier, learners need to be ready to learn and to have positive attitudes towards learning.

Case study 11: Dispositions

In a special school, weekly assemblies focus on behaviour and the development of positive dispositions. For acts of kindness, hard work and perseverance, primary school learners can be nominated for entry into the Golden Book. Names can be added to the Golden Book song which is sung on each occasion and learners also receive a golden leaf and a certificate. Learners can hang their pictures on the Golden Tree. This assembly brings opportunities to talk about behaviour and why particular learners have been selected. Learners have benefited as they are now more aware of their behaviour and its consequences.



f) Assessment for Learning

Developing thinking and assessment for learning are inextricably linked and similar strategies may be used to promote learners understanding of their goals/targets. Assessment for learning should help them to understand what they are trying to achieve (i.e. what good looks like) and how to improve.

Case study 12: assessment for learning

A teacher with a KS 2 class with a range of learning difficulties planned to increase the learners' involvement in their own assessment. Many of the learners found it difficult to talk about their work, in particular what was good and what could be improved. They tended to say what they thought the teacher wanted to hear and were often overly positive about their work/performance.

The introduction of traffic lights allowed learners to indicate in a more concrete way whether they understood lesson content – green for yes, amber for partly and red for not at all. The traffic light system was used as a basis for discussion about how learners felt about their own learning, developing skills in thinking and helping learners to express their own thoughts without prompting.

7. Development profile – planning to meet individual needs

Teachers should be aware of the development profile of all learners which will highlight any particular learning strengths and preferences and particular barriers to learning which must be taken account of when planning appropriate learning opportunities. Barriers may be caused by difficulties in accessing or processing incoming information and/or in organising, retaining or expressing ideas and may include:

- problems in perception/processing – with vision, hearing
- language and communication difficulties – difficulties in processing and comprehension, lack of expressive language
- difficulties in planning, organising, controlling impulsive behaviour
- impact of physical difficulties
- poor spatial organisation, concept of time
- difficulties switching attention between stimuli/sources of information
- needing extra time to process input and organise response
- difficulty defining problems, selecting relevant information
- difficulty making comparisons, projecting, imagining
- poor memory.

Teachers must start with learners' developmental profiles, considering their skills and learning preferences to build in appropriate options and flexibility for learners to gather and process information and respond in different ways.

8. Whole lesson/topic case studies

Case study 13 - De Bono's Hats

To introduce De Bono's thinking hats to learners working at earlier language levels, one teacher simplified the questions as follows:



White (Facts and information) – What do you see?
(hear/feel)
Yellow (Benefits) – What do you like?
Black (Problems) – What don't you like?
Red (Feelings) – What do you think? How do you feel?
Green (Creative, new ideas) – How can we make it better?
Blue (Thinking about thinking) – What do you think about
how you did that?

The teacher introduced the hats, which learners enjoyed using in the practical situation, one at a time to familiarise them with the questions. The blue hat is seen as more demanding and will be introduced at a later stage.

Case study 14 - Developing narrative skills

Using the *Reception Narrative* pack (Black Sheep Press/Stockport PCT 2002), speech and language therapists have worked with groups of learners to develop language and story telling skills, including the use and understanding of questions (who, where, when, what happens next?) and social use of language. Learning is supported by colours and symbols. See **Annex 5**.

Case study 15

<p>Context</p> <p>Learning intention</p> <p>Success criteria</p> <p>Rationale</p>	<p>KS2 special school (M/SLD)</p> <p>To understand that water changes from liquid to solid when placed in freezer</p> <p>Learners can predict and communicate that ‘water gardens’ placed in freezer will change from liquid to solid or water to ice.</p> <p>Practical activity used to give opportunities for:</p> <ul style="list-style-type: none"> • activating prior knowledge • linking and lateral thinking • thinking about cause and effect and making inferences. <p>Reinforced through hands on multi sensory experience, assessed by observation and questioning/discussion.</p>
<p>Activity <i>Preparation, Perception, Process, Presentation</i></p>	<p>Assemble equipment, describe activity drawing on prior knowledge/experience of making ice lollies. Learners perceive/experience cold, liquid, solid (observation, questioning). Learners gather items from garden to put in containers of water. Place in freezer. Predict what will happen through questions Show understanding by asking/answering questions: What will happen to the water garden? (<i>making inferences</i>) Why? (<i>cause and effect</i>) Can you tell me about another time you saw something like this happen? (<i>linking and lateral thinking</i>) What would happen if we left the garden out of the freezer? (<i>making inferences</i>) Why? (<i>linking and lateral thinking</i>)</p>
<p>Evaluation</p> <p>Thinking (<i>focus, questioning, organisation</i>)</p> <p>Social skills (<i>ability to initiate, respond, cooperate</i>)</p> <p>Dispositions (<i>curiosity, perseverance, confidence</i>)</p>	<p>All learners engaged in practical activity which helped focus/concentration, all asked/answered questions, some able to predict that the garden would freeze because of the cold temperatures and thaw again if left out of the freezer. Most able to make links to ice lollies and use of freezers at home for food etc. and recognise that ice is solid, water liquid. Some needed help to organise gathering materials, sequencing actions.</p> <p>Good cooperation, sharing materials, responses to hot/cold sensory stimuli, responses to questions. Some learners initiated discussion by asking questions.</p> <p>Most learners showed curiosity re items for garden, reasons for freezing garden. Some took questioning further, showing curiosity and perseverance. All gained confidence from carrying out practical task successfully - most independently and some under supervision.</p>

Case Study 16

<p>Context</p> <p>Learning intention</p> <p>Success criteria</p> <p>Rationale</p>	<p>Special school - PMLD class</p> <p>To respond to sensory stimuli during familiar story (some beginning to anticipate sequence of events)</p> <p>Learners respond through movement, vocalisation, pausing/indicating awareness of imminent events in sequence.</p> <p>Practical activity used to give opportunities for:</p> <ul style="list-style-type: none"> • activating prior knowledge • linking and lateral thinking • making inferences. <p>Range of stimuli used appropriate for learners' differing needs (visual/auditory/olfactory/tactile) in familiar sequence to support development of anticipation.</p>
<p>Activity <i>Preparation, Perception, Process, Presentation</i></p>	<p>Equipment assembled. Learners prepared by being placed in comfortable position, relaxed yet alert and signalled that story to be read.</p> <p>Learners use senses to notice/respond to stimuli</p> <p>Learners process information through appropriate sense:</p> <p>'What is it?'</p> <p>'Have I seen/heard this before?' (<i>activating prior knowledge, linking and lateral thinking</i>)</p> <p>'How do I react?'</p> <p>'What comes next?' (<i>making inferences</i>)</p> <p>Learners respond through turning to sound, changing facial expression, vocalising – note if response consistent on each presentation/if/how it varies between stimuli, note responses which might indicate anticipation.</p>
<p>Evaluation</p> <p>Thinking (<i>focus, questioning, organisation</i>)</p> <p>Social skills (<i>ability to initiate, respond, cooperate</i>)</p> <p>Dispositions (<i>curiosity, perseverance, confidence</i>)</p>	<p>Learners responses:</p> <p>Noticed stimuli (RM 1)</p> <p>Reacted to close contact with familiar adult (RM2)</p> <p>Responded to v. obvious stimulus (RM3)</p> <p>Demonstrated brief memory for previously presented stimulus (RM4)</p> <p>Responded to familiar voice (RM5)</p> <p>Some learners able to focus on stimuli, consistent response showing memory of stimulus - shows beginning of comparing/classifying stimuli – asking questions such as 'What is it?', 'Do I like it?'. Responded to familiar voice, cooperating and responding.</p> <p>Increasing time focused/range of stimuli/acceptance and recognition of positive feedback</p>

Case Study 17

<p>Context</p> <p>Learning intentions</p> <p>Success criteria</p> <p>Rationale</p>	<p>Special school - KS2 class</p> <p>To develop learners':</p> <ul style="list-style-type: none"> • questioning - why? what if..? how? where? • awareness of wind direction • skills in measuring, cutting, joining. <p>To think about cause and effect and use success criteria.</p> <p>Learners will make and fly a kite individually/in pairs.</p> <p>Practical activity used to meet wider range of needs and motivate learners. Also to give opportunities for:</p> <ul style="list-style-type: none"> • activating prior knowledge • linking and lateral thinking • determining success criteria • thinking about cause and effect and making inferences • monitoring progress • reviewing outcomes and success criteria • reviewing process/method.
<p>Activity <i>Preparation, Perception, Process, Presentation</i></p>	<p>Prepare materials – coloured paper, kebab sticks, plastic tape, string, card and tools for measuring, cutting, pasting etc.</p> <p>Discuss kites, different shapes, materials: How do they fly? What helps them to fly? (wind, shape, material, tail etc) <i>(activating prior knowledge, linking and lateral thinking)</i> How do you know this? <i>(activating prior knowledge, linking and lateral thinking)</i> Reinforce with pictures/video, practical activity.</p> <p>Develop success criteria for How will you know your kite is a success? <i>(determining success criteria)</i> What does the tail do? <i>(cause and effect)</i> What happens if we change the shape, make holes in it? <i>(cause and effect)</i> Choose method to make kite. Follow instructions (could be provided with pictures/symbols/sequence cards etc.) <i>(monitoring progress)</i> Fly the kite. Look at the wind – speed, direction. How well does the kite fly? <i>(reviewing outcomes and success criteria)</i></p>

<p>Evaluation</p> <p>Thinking (<i>focus, questioning, organisation</i>)</p> <p>Social skills (<i>ability to initiate, respond, cooperate</i>)</p> <p>Dispositions (<i>curiosity, perseverance, confidence</i>)</p>	<p>Evaluate activity by posing questions: What went well? (<i>reviewing outcomes and success criteria</i>) What could we do to improve it? (<i>reviewing process/method</i>) Thinking about the material, size, shape, tail etc. Predict what might happen if we...? (<i>making inferences</i>) Photos /video could be used. Many of the group made the connection between material/shape/tail and kite's performance.</p> <p>Learners developed questioning skills, ability to organise and work more independently following prompt cards. They worked with others, responding to suggestions from staff and peers.</p> <p>When kites flew, they gained confidence and wanted to continue work to improve and try new ideas.</p>
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Case Study 18

<p>Context</p> <p>Learning intention</p> <p>Success criteria</p> <p>Rationale</p>	<p>Special school - KS3 class</p> <p>Tessellation – Which 2D shapes can be placed together without leaving gaps?</p> <p>Learners able to make patterns using their knowledge to select shapes which would fit together.</p> <p>Learners review prior knowledge of shapes and their properties and followed visual/practical activities to understand tessellation. Practical activity used to meet wider range of needs and motivate learners. Also to give opportunities for:</p> <ul style="list-style-type: none"> • activating prior knowledge • linking and lateral thinking • making inferences • reviewing the process/method.
<p>Activity</p> <p><i>Preparation, Perception, Process, Presentation</i></p>	<p>Learners prepared by discussion of shapes and their properties. What shapes fit together? How do you know this? (<i>activating prior knowledge, linking and lateral thinking</i>)</p> <p>They looked at examples of tessellations, then chose shapes and drew around them. Why did you choose that shape? (<i>making inferences</i>)</p> <p>They used shapes to make designs which they shared with others, commenting on what they liked/disliked and how they could be improved (<i>reviewing the process/method</i>).</p>
<p>Evaluation</p> <p>Thinking (<i>focus, questioning, organisation</i>)</p> <p>Social skills (<i>ability to initiate, respond, cooperate</i>)</p> <p>Dispositions (<i>curiosity, perseverance, confidence</i>)</p>	<p>Learners were able to compare patterns to floor covering in their homes. They commented on others' designs and how they could improve e.g. modify overlapping patterns. They discussed ways of fitting shapes together – sides or corners touching, looked at any gaps and the shape of gaps. They drew conclusions about groups of shaped which fitted together, number of sides etc.</p> <p>They worked well together, asking/answering questions and giving/receiving feedback on their designs.</p> <p>Some learners had to work hard to persevere with the motor aspects of the task</p>

Case Study 19

<p>Context</p> <p>Learning intention</p> <p>Success criteria</p> <p>Rationale</p>	<p>Special school - KS3 class</p> <p>To explore ways of sorting/separating different mixtures/materials</p> <p>Learners consider the different methods used in terms of time taken and effectiveness of the process</p> <p>Problem solving, practical activity used to meet wider range of needs and motivate learners. Also to give opportunities for:</p> <ul style="list-style-type: none"> • activating prior knowledge • thinking about cause and effect • monitoring progress • reviewing outcomes and success criteria • reviewing process/method.
<p>Activity <i>Preparation, Perception, Process, Presentation</i></p>	<p>Read book Tidy and Sort* to provide a stimulus for activities involving sorting and separating of materials.</p> <p>Learners handle different mixtures, e.g. sweets, muesli, lego, pasta, marbles and discuss properties. They try to sort some mixtures by hand to see how long it takes. They explore a range of nets, sieves etc. to separate materials. (<i>activating prior knowledge, cause and effect</i>)</p> <p>Tackle problem posed in the story – how to separate postage stamps and paper clips. Learners make suggestions then try out in small groups. Similarly for lego and marbles (<i>monitoring progress</i>). Learners design a method of recording.</p> <p>Discuss success i.e. time taken, effectiveness of method. Groups report back findings: method used, time taken how process could be improved. (<i>reviewing outcomes and success criteria, reviewing process/method</i>)</p>
<p>Evaluation</p> <p>Thinking (<i>focus, questioning, organisation</i>)</p> <p>Social skills (<i>ability to initiate, respond, cooperate</i>)</p> <p>Dispositions (<i>curiosity, perseverance, confidence</i>)</p>	<p>Learners suggestions included:</p> <ul style="list-style-type: none"> • blow stamps away from paperclips • use a magnet <p>and for lego and marbles:</p> <ul style="list-style-type: none"> • add water to see if lego floats • put on a tray and tip so marbles roll away • put through a sieve • use a funnel/net. <p>The real problem solving approach provided a motivating context – learners focused, asked questions, shared information. They were happy to try several different approaches and gained confidence when their tentative suggestions, based on prior knowledge of materials/properties, worked well.</p>

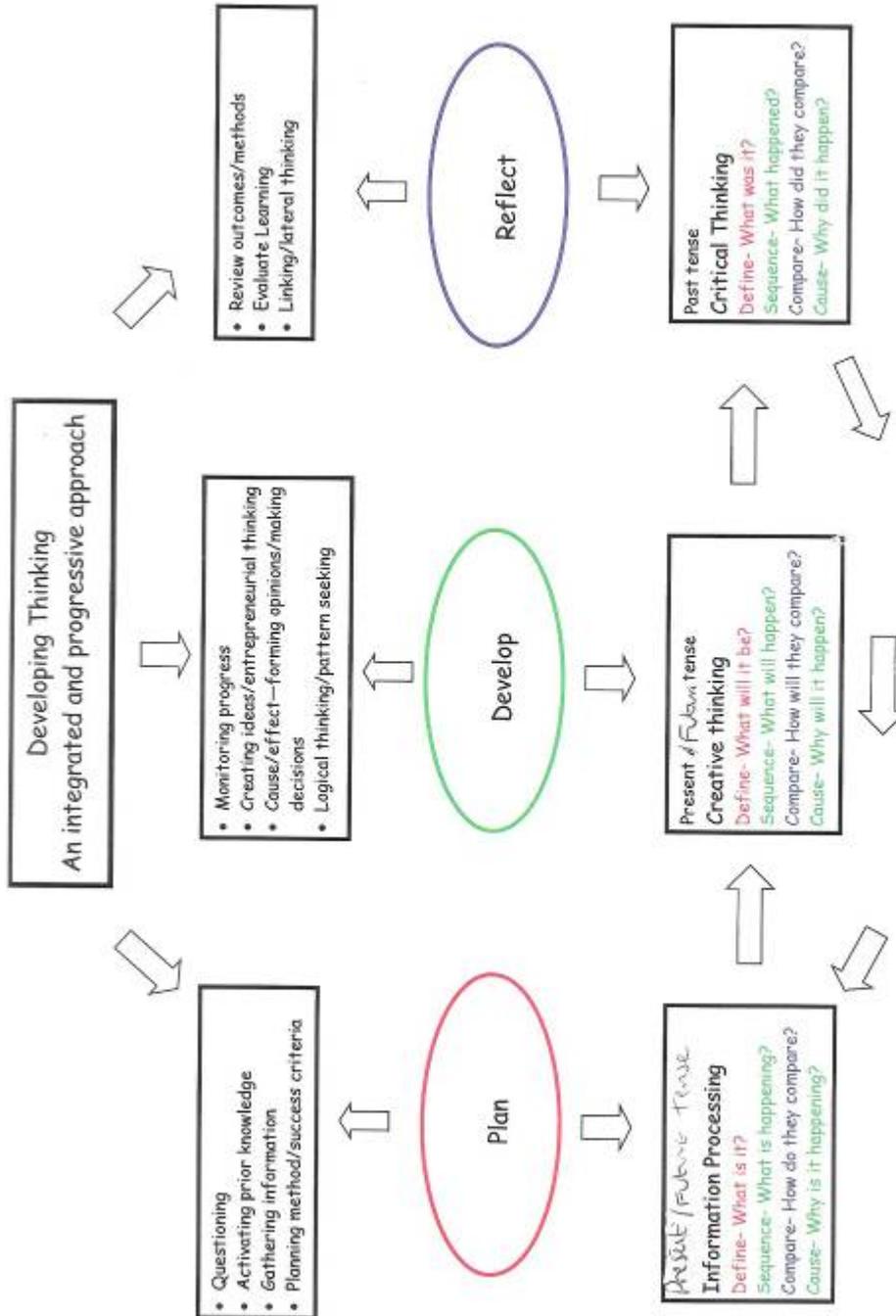
* from Chemical Industry Education Centre www.ciec.org.uk

Case Study 20

<p>Context</p> <p>Learning intention</p> <p>Success criteria</p> <p>Rationale</p>	<p>Special school - Year 3</p> <p>To sort clothes for summer/winter wear.</p> <p>Learners sort according to given criteria and apply knowledge in a practical situation.</p> <p>Relevant problem solving, practical, multi-sensory activity used to meet wider range of needs and motivate learners. Also to give opportunities for:</p> <ul style="list-style-type: none"> • asking questions • thinking logically • activating prior knowledge.
<p>Activity <i>Preparation, Perception, Process, Presentation</i></p>	<p>Set scene: I am going on holiday and need to pack a suitcase. Learners help. What is the problem? - Case too full. What can I take out? Where are you going? Will it be hot/cold? (<i>asking questions</i>) Sort clothes into hot/cold weather (or either) using hoops on floor. (<i>thinking logically, activating prior knowledge</i>) How can we record this? Draw, label, make a chart etc Explain choices made.</p>
<p>Evaluation</p> <p>Thinking (<i>focus, questioning, organisation</i>)</p> <p>Social skills (<i>ability to initiate, respond, cooperate</i>)</p> <p>Dispositions (<i>curiosity, perseverance, confidence</i>)</p>	<p>Handling clothes helped focus attention and helped decisions re sorting clothes. Questioning skills developed as children thought about the problem and how to solve it – need to decide on criteria and sort items.</p> <p>Learners had to cooperate over initial activity using hoops - some emerged as leaders but all engaged.</p> <p>Some learners were involved in further work regarding recording a third category – clothes suited to both seasons, which lead to introduction to a simple Venn diagram.</p>

Case Study 21

A plan integrating Caviglioli's questions into the developing thinking framework



The development of thinking skills occurs throughout the curriculum. Progress is shown through the curriculum material that is used and subsequent curriculum assessment. This model follows a three part plan though all thinking is grouped into four parts: Define, Sequence, Compare and Cause.

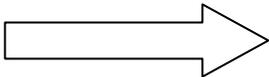
9. Management implications

To ensure success, a whole school approach is needed. Below is a checklist generated by the schools in the development programme pilot for thinking and assessment for learning to identify the most important areas.

- Developing thinking/assessment for learning needs to be a whole school initiative with commitment and support from senior managers, governors and all staff
- Shared principles and common language need to be developed (e.g. core vocabulary, questions on display)
- Outcomes should be shown via case studies to show benefits for teachers and learners
- Teachers need opportunities for dialogue with others to support them in their role as learners
- Templates and starters can be offered to support changes in pedagogy e.g. simple visual tools/frameworks – but within a clear rationale and plan for coherent whole school development
- Training needs should be identified/addressed in particular there is a need for information about language development
- Teachers need time to observe others/reflect on their practice
- Teachers should focus on interactive techniques to develop information processing not just information receiving or repeating
- When recording/documenting learning, teachers should focus on making learning visible – focusing on learning not just “something we did”.
- Opportunities for choice in the classroom will help more learners to access and process material and respond in ways appropriate to their needs
- A positive classroom climate will develop personal and life skills as well as subject content
- The leadership team need to monitor/evaluate, communicate findings/development plans and provide appropriate support.

Annexes

Annex 1 Draft progression grid – from Routes for Learning to the Developing Thinking section of the Skills framework – finalised version will be available once trialling is complete.

Process	Principle from Developing thinking	Link to Routes for Learning		First cell of developing thinking framework
	Asking questions	<p>Routes box 25 Changes behaviour in response to interesting event nearby</p> <p><i>Points uh uh?? (What is it?) links to 'gains attention (box 32) & gains attention to satisfy need (request object) box 39) Early questions may be traced back to turning to a stimulus – e.g. a sound – with an implied question 'what will I see ?</i></p>	<p>Uses word/ signs which imply a question e.g. 'mummy?' contextual knowledge needed to interpret eg. 'when's mummy coming?' Or 'where's mummy?'</p> <p>May repeat question many times even after answered and may repeat answer</p> <p>Can use information given in answer to 'when ?' by saying 'swimming now' following previous dialogue, gets swimming gear at appropriate time.</p>	Ask why, what, how, where, when etc.

	<p>Activating prior skills, knowledge and understanding</p>	<p>Routes box 31 Repeats action when first attempt unsuccessful <i>NB. Routes box 34 is essential here as without object permanence mental representation isn't possible</i> Link to Routes boxes 36, 37, 39, 41 Routes box 42 Tries new strategy when old one fails</p>	<p>Uses previously successful action in new situation e.g. <i>shakes container to get contents out, through small hole when this has previously been successful with another container</i></p> <p>Seeks help when unsuccessful themselves e.g. <i>Hands item to another person to be operated after trying and failing themselves, showing awareness of skills of others</i></p>	<p>Shows awareness of personal needs and skills Asks for help appropriately, gives reason e.g. <i>says can't reach'</i></p> <p><i>Responds to request for help when they have relevant skills, and says 'too hard' or 'not me' when does not have relevant skills/ suggests other person e.g. John's tall he can reach</i></p> <p><i>May choose to sit by someone they see as being good at particular activity, using prior knowledge</i></p>
	<p>Gathering information</p>	<p>Routes box 27 Intentional exploration of the environment</p>	<p>Actively/systematically explores object using range of strategies</p>	<p>Chooses from given options where to find information and ideas <i>(working from concrete to more abstract)</i></p>

	Determining the process method and strategy	Routes boxes 35, 38 , 42 Does two different actions in sequence to get reward, modifies action when repeating action does not work, early problem solving, tries new strategy when old one fails	Recalls two step sequence for performing task	Choose from given options what to do and how to do it <i>May give a reason (e.g. microwave safer than using pan on hob)</i>
	Determine success criteria			Identify in response to questions, some basic success criteria for what is going to be done

DEVELOP	Generating and developing ideas	Routes box 27 Intentional exploration of the environment	Explores properties of everyday objects with assistance e.g. demonstration from adult	Show curiosity and explore everyday stimuli
	Valuing errors and unexpected outcomes	Routes box 14 Anticipates repetitively presented stimulus 17 Anticipates within social routines	Shows surprise if routine interrupted/ changed	Show surprise at unexpected outcomes

	Entrepreneurial thinking	Routes box 42 Tries new strategy when old one fails <i>e.g. tries action remembered and copied from earlier interaction with adult (deferred imitation)</i>	Chooses between two familiar strategies (in advance) e.g. indicates picture of shaking or weighing to decide which box contains hidden object Willing to copy new strategy demonstrated by trusted adult <i>e.g. copies alternative method of operating switch</i>	Favour the familiar when presented with new ideas Recognises that others may not share preferences
	Thinking about cause and effect and making inferences	Routes box 26 Contingency Awareness	Given two switches attached to preferred and less preferred toy tries both once only Can say/ point to which switch will operate toy (without trying out first) From choice of two, selects item which caused given effect e.g. bubbles in bowl of water	See simple links between cause and effect in everyday routines; make and try out simple predictions

	Thinking logically and seeking patterns	Routes box 12 Responds differently to different stimuli Routes box 14 Anticipates repetitively presented stimulus Also link to boxes 17, 30 ,33	Experiments, and sorts objects by properties e.g. float/sink	Identify obvious observed differences
	Considering evidence, information and ideas	Routes box 34 Object permanence	Selects appropriate item for task in hand , recognising object function <i>e.g. put on painting apron, say it's time for painting. what do we need? offer choice of paintbrush and spoon</i>	Begin to understand that some things are 'fact'
	Forming opinions and making decisions	Routes box 36 Selects from two or more items Routes box 41 Expresses preference for items not present by symbolic means	Choice/preferences relate to some criterion – e.g. changes to appropriate PE kit recognising that s/he will get sweaty	Begin to express own opinions and make decisions in everyday routines
	Monitoring progress			With support follow the chosen process method

REFLECT	Reviewing outcomes and success criteria	Routes box 42 Tries new strategy when old one fails. Links to 31,35, 38 or 42	Sorts items by one obvious property, can answer whether they are sorted or not <i>e.g. red and yellow</i> Says in advance what is to be done	Begin to link outcomes to success criteria Discusses strategies in terms of more than one criterion for success
	Reviewing the process/ method	Routes box 38 Modifies action when repeating action does not work Routes box 39 Deliberately gains attention of another person to satisfy need - asks for help with problem	Asks for help and indicates in some way what the problem might be (<i>e.g. points to obviously broken wire between switch and toy</i>)	Show or describe some of what has been done, identify in response to questions, what worked and what didn't
	Evaluate own learning and thinking			Show, in response to questions some of what has been learned/ found out
	Linking and lateral thinking	Routes box 42 Tries new strategy when old one fails	Tries old strategy in new context...when prompted <i>e.g. knows that shopping can be remembered by using a pictorial list, when reminded of this suggests making pictorial list of items need for the class picnic</i>	Make links between everyday routines in different contexts

Annex 2 Key features of progression in language

The table below summarises the key features of the levels proposed by Blank et al (1978)¹⁶ and further developed by Elks & Mc Lachlan (2006)¹⁷ in moving towards the development of verbal reasoning and abstract language. Level 1 applies to learners who have symbolic communication (i.e. the most advanced skills of the Routes for Learning Routemap).

Level 1	The learner matches immediate perceptions to language. His/her response involves matching what s/he experiences (through appropriate sensory channels) to a relevant language label – symbol, sign, word. Here the focus is on the whole object. (e.g. What is it? A dog)
Level 2	The learner matches immediate perceptions but more selectively with greater attention to detail (e.g. the dog is big, black, furry) This may introduce some abstract ideas and will involve comparison with previous experiences to establish differences as learners begin to sort and categorise. Learners may consider an object's function as well as appearance and in describing and giving information, can ask and answer the questions what? (simplest) who? and where?
Level 3	The learner uses language to re order his/her perceptions/experiences. S/he begins to infer and make predictions. The focus is on objects in context and s/he makes links, identifying similarities. Learners may order pictures or re tell stories in sequence, understanding “when” questions. They can predict what happens next and talk about characters feelings.
Level 4 (4 -6.5 years)	The learner is able to think about relationships between objects, people and events and give reasons why things happen. S/he can begin to justify predictions, identify causes, solve problems (including from another persons' point of view (e.g. What could John do if he missed the bus?) make inferences from an observation (How can we tell if this toy is old?) select a means to achieve a desired goal (What do we need to bake a cake?)

¹⁶ Blank, M.; Rose, S.A.; & Berlin, L.J. (1978). *The language of learning: The preschool years*. Orlando, FL: Grune & Stratton.

¹⁷ Elks L & Mc Lachlan H. (2006) Early Language Builders Elklan (www.elklan.co.uk)

Annex 3 A continuum of questions

The table contains a continuum of questions, to meet the needs of learners working at the earliest levels of development through into the developing thinking area of the Skills framework.

It draws on the work of Anderson and Krathwohl (2000)¹⁸ who revised Bloom's Taxonomy as follows:

REMEMBER, UNDERSTAND, APPLY, ANALYSE, EVALUATE, CREATE

Links to <i>Skills framework</i>	Links to revised Bloom's taxonomy	What teacher does or asks...		
		Early learning /pre verbal (Ref: <i>Routes for Learning</i>)		
Plan asking questions, activating prior skills, knowledge, understanding, gathering information (later deciding on actions, success criteria)	Define Remember Recognise Identify Name Observe Find	Present different stimuli for learner to notice (through senses) and begin to form object concepts e.g. dog - What is it? What does it look, feel, smell, taste like? Exploring – gathering information, activating prior knowledge/experience to recognise and make sense of objects /actions, noticing detail as a basis for categorizing What? Who? Where?	What can you tell me about...? Where can we find? Do you remember when we...? What shall we do? Who can help us? How can we...?	What is the task/problem? How are you going to...? How do you think that...? What do we need to know/do? How can we find out? What do you already know? What skills/strategies might be useful? What tools/equipment do we need? Have you done ... before?

¹⁸ Anderson, L. W. Krathwohl, D. R.(2000) *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*. Boston:Allyn & Bacon

<p>Develop generating ideas, cause and effect, seeking patterns, making decisions (later valuing unexpected outcomes, entrepreneurial thinking, considering evidence, monitoring progress)</p>	<p>Generating ideas, Compare Sequence Explain Describe Associate Differentiate Group/classify Summarise Select Transfer Apply Use, carry out Suggest</p>	<p>Present range of stimuli – learners respond and show preferences Anticipate – recognising cues for familiar events, seeking patterns, order in daily routines Make choices (of 2) When? What's next? Is this like something I've seen/heard/felt before?</p>	<p>What does x mean? Can you describe...? If we do... what do you think will happen? Shall we try...? What do we need to do next? What's the difference? Have you seen/done something like this before? Where else might this be useful? What might help us choose?</p>	<p>Did you decide that..? Where might...? Have you..? What do you mean by that? Can you give me an example? Can you think of...? Can you explain how..? What did you notice when...? Why did you decide to...? Could you try..? (1 or 2 ideas) How might you sort/organise..? Have you talked to...? Would a help?</p>
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<p>Reflect on own behaviour and influence (later reviewing outcomes, success criteria, process, evaluating own learning/thinking, linking/lateral thinking)</p>	<p>Analyse Create Reason Order, organise Invent Conclude Combine predict Improve Suppose Judge Criticise Prioritise Assess Argue Appreciate</p>	<p>Teacher creates opportunities for learner to influence what happens to develop awareness of effect of own behaviour e.g. ability to gain attention and cause & effect – memory of what action lead to effect, beginning to try new strategies if not successful</p> <p>How did I do that? Why did x happen? What else can I try?</p>	<p>Do you remember what happened? (first...then..) What did you like/not like? Who helped you? What worked/didn't work? Why do you think... happened? What would happen if...? What else could we try?</p>	<p>Why did... happen? What/how could you improve? Can you explain...? (reasons) How did you solve the problem? Which strategies/materials were best..? What would you try next? How did you check..? What do you think about..? Can we use these ideas in...? Is it a fact that...? Does it matter..? Do you agree..?</p>
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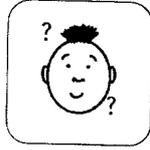
Annex 4 TASC Wheel

(C. Belle Wallace 2000 reprinted with permission)



Annex 5 Reception Narrative Pack story components

Story Components



Who =

Orange



Where =

Red



When =

Green



What
Happened =

Yellow

Annex 6 Useful references and resources

Anderson, L. W. Krathwohl, D. R.(2000) *A Taxonomy for Learning, Teaching, and Assessing: A Revision of Bloom's Taxonomy of Educational Objectives*. Boston: Allyn & Bacon

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- Iley P (2005) Using literacy to develop thinking skills (5-7 or 7-11) (Published by Taylor & Francis)
- Jeffries & Hanock Thinking Skills – A Teacher's Guide (Hopscotch)
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- Morgan N Saxton J (2006) Asking better questions Ontario: Pembroke Publishers
- Myhill D, Jones, S Hopper R (2006) Talking. Listening, Learning Open University Press
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- Siegler RS (1998) Children's Thinking Prentice Hall
- Smith I (2006) Learning to Think Learning Unlimited
- Staricoff M Rees A (2006) Start Thinking: Daily Starters to Inspire Thinking in Primary Classrooms (Australian Council for Educational Research)
- Sternberg RJ, Spear-Swerling L (1996) Teaching for Thinking American Psychological Association
- Wallace B (2002) Teaching Thinking Skills Across the Early Years David Fulton Publishers

WAG publications

Welsh Assembly Government 2006 Routes for Learning. See <http://wales.gov.uk/topics/educationandskills/?lang=en> click on curriculum & assessment, primary/secondary, whole school, additional needs guidance

WAG, Estyn, BBC Cymru Developing Thinking Across the Curriculum (Aiming for Excellence Series)

Why develop thinking skills and assessment for learning? and *How to develop thinking skills and assessment for learning in the classroom*, Thinking and assessment for learning poster and leaflet at <http://wales.gov.uk/topics/educationandskills>

Resources

The following resources which schools in the development programme found helpful. Inclusion here does not imply any recommendation by Welsh Assembly Government.

Create & develop a thinking classroom, Time to Talk, Listen think and Do, Creating an effective learning environment, Why? Because, Chatter box, pattern cards, SEQ thinking sets, Thinking stories to wake up your mind, early years circle time “Here we go round..” – all from LDA
<http://www.ldalearning.com>

www.tascwheel.com _ More information about TASC

www.featherstone.uk.com Early years publications including “Sustained, shared thinking” and Foundations for Independence

<http://highscope.org/index.asp> Highscope information and books such as Making the most of PLAN DO REVIEW by Nancy Vogel

<http://www.early-education.org.uk/index.htm> Early years publications

<http://www.zerotothree.org/site/PageServer?pagename=homepage>

<http://www.underfives.co.uk/index.htm>

http://www.standards.dfes.gov.uk/research/themes/early_years/FriMar191511092004/673743 (DCSF Early thinking)

<http://www.journal.naeyc.org/btj/200309/Planning&Reflection.pdf> How Planning & reflection helps young children develop thinking skills plus other useful links

http://www.projectapproach.org/index.php?option=com_frontpage&Itemid=28
Website for the Project Approach Katz and Chard work on Engaging Children's Minds

www.scholastic.co.uk You can create a thinking classroom, Thinking Skills 5-7

<http://www.prodplay.co.uk/products?subject=5&product=16> Consequences software for PSHE English/Welsh

www.questionsonlinecatalogue.co.uk

www.dialogueworks.co.uk (resources including Storywise – Thinking through stories)

www.tuckswoodfirst.co.uk Examples of Philosophy for Children

www.thinkingonlinecatalogue.co.uk Range of books including Belle Wallace - Teaching thinking skills across the early years

Max de Boo – Using Science to develop thinking skills at KS1
http://www.nace.co.uk/bookshop/bookshop_thinking_skills.htm

www.teachingthinking.net Website of Robert Fisher

www.learningunlimited.co.uk Learning Teacher series including Learning to Think, Assessment for Learning, Fostering Creativity

Northumberland Thinking Skills
<http://ngfl.northumberland.gov.uk/thinking/map/frames/bipicset.htm>

Harvard's Making Learning Visible website
<http://www.pz.harvard.edu/mlv>

Software

Thinking with pictures www.logo.com

2Simple software <http://2simpleshop.com>

www.mdlsoft.co.uk Task Magic software

www.taglearning.com Inspiration software

http://www.inclusive.co.uk/catalogue/acatalog/kidspiration_21.html
Kidspiration software

www.visualthesaurus.com Interactive/visual dictionary